To: Federal-State Marketing Improvement Program
Agricultural Marketing Service
United States Department of Agriculture

Title: **Nopalitos: Florida's New Niche Production Commodity**
Final Report for Agreement #12-25-G-0382

Submitted by: The Florida Department of Agriculture and Consumer Services
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Abstract: Nopal means cactus in Spanish and Nopales is the term for "cactus stem." The term Nopalitos refers to the pads once they are cut up and prepared for eating. The Nopal has been used as a medicinal plant and is a hallmark vegetable in the Latin American diet. U.S. consumers' growing knowledge of the benefits of nopales has increased interest and demand.

The Florida Department of Agriculture and Consumer Services (FDACS) requested and received FSMIP funds for developing and testing new or more efficient methods of processing, packaging, labeling, handling, storing, transporting and distributing Nopalitos. The funds were also be used to assess customer response to Nopalitos and evaluate potential niche marketing opportunities for U.S. producers, processors, and agribusinesses in domestic and international markets. Problems and barriers in existing channels of trade, transportation and distribution were identified and improvements to marketing practices, facilities, or systems to address these barriers were explored. Challenges to the exporters of Nopalitos will be addressed. Small and medium scale producers were assisted in their attempts to access the new and expanding Nopalitos market and apply supply chain management in the marketing system.

An array of dishes and beverages made with nopales.
In the bowl with other ingredients are fresh nopales. *AP/Photo/L.M. Otero*

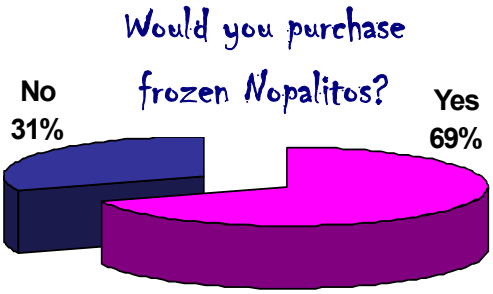
Goals and Objectives

- To develop and test new or more efficient methods of processing, packaging, labeling, handling, storing, transporting and distributing frozen Nopalitos.
- To conduct market research on Nopalitos consumers in order the identify challenges and impediments to marketing frozen Nopalitos domestically and internationally.
- To conduct separate market research among agricultural commodities producers and growers in order to identify challenges and impediments to growing Nopalitos, toward the end of assisting them with production and marketing strategies.
- To provide educational outreach to producers, distributors and consumers about frozen Nopalitos in order to facilitate the increase for the supply and demand of frozen Nopalitos.
- To encourage cooperation and unification in the expansion of the frozen Nopalitos industry in order to increase sales and profitability.

Work Plan

Study the uses and value to consumers of food labeling and packaging alternatives for frozen Nopalitos.

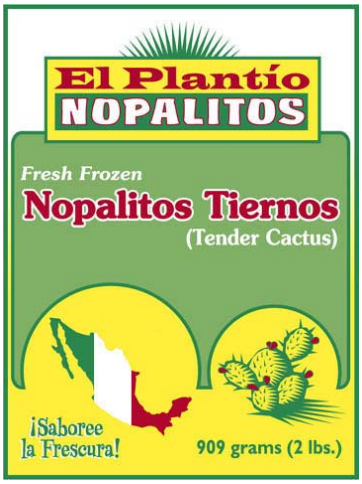
- **Use information collected in a North Florida focus group to develop package sizes and labeling.**
  In the first focus group conducted in North Florida, the majority of the respondents said they would be open to purchasing frozen Nopalitos. A brightly colored package in a one-pound size was a marked preference. Ninety-three percent of the group replied that they notice the labeling when purchasing fruits and vegetables and 69% said packaging is an important influence on their purchasing behavior.



Green (44%) and blue (19%) and red (15%) were chosen as the most attractive colors for labeling and/or logo. The package design below uses 2 of those colors, red and green. Yellow was added to brighten the design and catch the attention of the consumer. Warm colors, such as red, yellow and orange, have been found in consumer studies to promote hunger. Green is often associated with freshness. Studies have also proven that hunger and eating are based on cognition. For example, looking at a yellow banana makes one to want to eat it, but a red banana does not. Similarly, red or green can trigger hunger for an apple, but not blue. Food that has naturally occurring blue color is rare, so blue is

considered an appetite suppressant. *(California State University, 1997)* All these factors were taken into consideration during the development of the package design.

A two-pound package size was selected over the survey data preference for a one-pound package. The larger size is applicable to both retail and food service use. A one-pound package may be developed and released after consumer purchase trends have been tracked and studied and a definite need is identified.



Front

Back

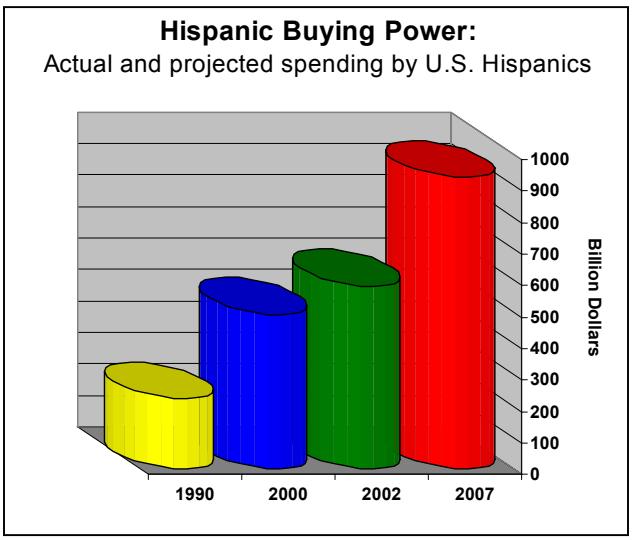
This two-pound package design was developed in coordination with Plantation Specialty Foods, Inc. (PSF) PSF is the only company in the U.S. to date reported to be processing and packaging frozen Nopalitos. El Plantio is the brand name label developed for the PSF line of Hispanic food products.

- **Conduct a focus group to evaluate new packaging and labeling.** Research was conducted by the Florida Department of Agriculture and Consumer Services' (FDACS) Division of Marketing and Development in Miami, Florida. Both in a controlled focus group setting and during in-store surveys, there was a very positive reaction to the color and design of the packaging. (Research project is detailed beginning on page 6.) The following suggestions for improvement were offered:
    1. Add a photo of a prepared dish--- per a Bird's Eye or Green Giant brand package
    2. Update the look to make it more contemporary in appearance
    3. Produce a 1 pound package for retail sale
    4. Translate "Saboree la Frescura" (Taste the Freshness) into Chinese and English to appeal to Asians and Americans.
    5. Add more recipes with amounts and seasonings for other ethnic groups.
    6. Mention the health benefits of the product.
    7. Describe the flavor and uses of the product---i.e.: "use as a filler or replacement for green pepper in your recipes," etc.

Assess customer response to frozen Nopalitos and evaluate potential marketing opportunities for U.S. producers, processors, and agribusinesses in domestic and international markets.

- **Continue Hispanic demographics research both domestically and globally.** The market for Nopalitos is substantial. Hispanic shoppers represent the fastest-growing market in the U.S., with purchasing power of $542 billion in 2001, according to U.S. Hispanics: Insights Into Grocery Shopping Preferences and Attitudes, 2002.

The 2000 U.S. Census reported that 21,000,000 people in the United States call themselves Mexicans. This would equate to a potentially untapped market of 257,880,000 pounds or approximately an annual business of $356 million. Hispanic culture, purchasing habits and preferences continue to interest businesses, retailers and governmental agencies as their population and influence expands throughout the United States. Over the last two decades the percentage of Hispanics comprising the U.S. population has steadily increased from 6.5% in 1980 to 12.6% in 2000 (US Census 2000) with projections of 18% by 2020.



The Nopal, an Opuntia species, is grown all over Mexico for its edible *pencas* (fleshy leaves). The nopal also produces the cactus pear fruit and is an important forage crop. In addition, it was the basis of the cochineal-carmine dye industry until the 1800s. Nopal means cactus in Spanish and Nopales is the plural term for "cactus leaves." The term Nopalitos refers to the leaf pads once they are cut up and prepared for eating.

A Mexican American farmer tends nopales on a small patch of land in Baja, California.

A woman selling bagged fresh Nopalitos in an open market in Mexico.

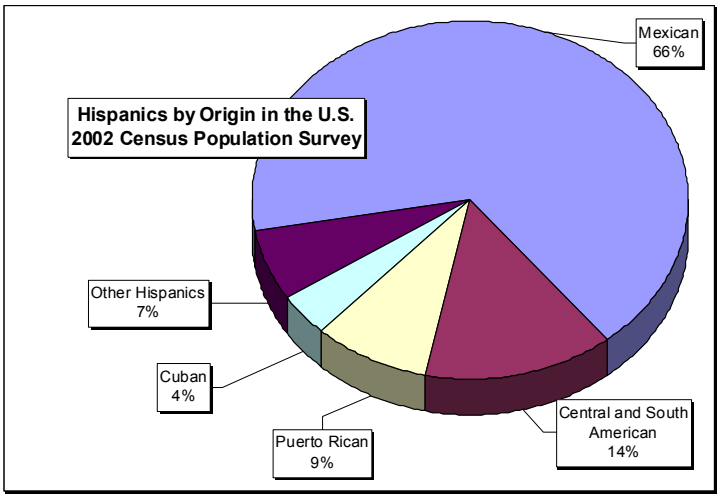
Nopalitos processed in brine or vinegar and packed in glass jars are exported in large volumes from Mexico. Over thirty Mexican companies process and export approximately 3,500 tons of Nopalitos each year to American markets. Pickled Nopalitos compare to fresh Nopalitos the way fresh cucumbers compare to pickled cucumbers.

Nopales are central to the indigenous culture of what is now the southwestern US and Mexico. In cases of drought, nopales were the lifeblood of ancient cultures here, food for both people and their livestock. Nopales were also used to soothe wounds, stiffen cloth, strengthen mortar and fence off wild animals. Cattle that grazed on nopales were said to develop a special flavor in their meat and milk. Currently, nopal cactus is being studied for use as a potential source of anti-polluting agents to purify water, as a source of oil, and as a mechanism to prevent soil erosion.

Consumers prefer fresh Nopalitos, but shipping them is difficult. The cactus pads are thorny and the consumer has the unpleasant task of cleaning them. If the Nopalitos are shipped cleaned of thorns they tend to oxidize and have a short shelf life. Some companies dethorn and dice the Nopales, seal them in plastic bags and ship them in refrigerated trucks to U.S. markets, but the quality is low, the price is high, and they spoil within 2-3 days.

Nopales are Mexico's fifth most used vegetable by weight and seventh by value. Research shows that Mexicans consume approximately 12 pounds of nopales per person per year. Nopalitos are typical of Mexican food and a community with a high percentage of Mexican population would be more likely to recognize the product, be experienced in using it and enthusiastically try this processed frozen version of the traditional nopales.

Potential markets identified for frozen Nopalitos represent high concentrations of Mexican American populations in the United States. According to the US Census Bureau, Latinos of Mexican origin were more likely to live in the West (54.6%) and the South (34.3%). Nearly half of all Hispanics lived in central cities within a metropolitan area (45.6%).



Further testing in the following U. S. market areas is recommended:

US Census Bureau QuickFacts	Arizona	California	Georgia	Illinois	New York	Texas
Population, 2000	5,130,632	33,871,648	8,186,453	12,419,293	18,976,457	20,851,820
City recommended	Phoenix	Los Angeles	Atlanta	Chicago	New York	Dallas
Hispanic origin	25.3%	32.4%	5.3%	12.3%	15.1%	32.0%
Median income	$40,558	$47,493	$42,433	$46,590	$43,393	$39,927
Per capita income	$20,275	$22,711	$21,154	$23,104	$23,389	$19,617
Retail sales per capita	$ 9,657	$ 8,167	$ 9,646	$ 8,992	$ 7,678	$ 9,430

If you weren't brought up in a Mexican community or had close connections with Mexican immigrants, you would probably never have encountered Nopalitos. It is strange that other countries have not incorporated them into their diet, because many people in southern Europe and North Africa (especially Morocco) consume them in large quantities. Because they adapt well to hot, dry climates, the nopal has also become an important crop in Israel and southern Italy. Other Hispanic ethnic groups, such as Cubans, are not familiar with the nopal cactus and will require extensive marketing and education on frozen Nopalitos.

- **Research and explore other ethnic groups' interest in Nopalitos by conducting a series of focus groups. Evaluate the information and create a custom marketing plan targeting specific ethnic groups.**

Miami was chosen as the site of a series of focus groups and in store demonstrations and taste tests. Demographic research collected by the U.S. Census Bureau in Miami-Dade County, Florida in 2002 shows that over half of the population of approximately 2.3 million is of Hispanic or Latino origin and race. Among people at least five years old living in Miami, 70% spoke a language other than English at home. Of those, 88% spoke Spanish and 12% spoke some other language.

US Census Bureau QuickFacts: 2002	Miami
Total population	2,286,228
Asian population	45,330
Mexican population	38,124
Puerto Rican population	85,362
Cuban population	695,122
Other Hispanic or Latino	555,498

Method One: Focus Groups

Utilizing an independent contractor, three separately controlled focus groups were scheduled and conducted in order to test consumer response to frozen Nopalitos. Group One was made up of local professional chefs working in ethnic restaurants, both Cuban and Chinese. Group Two was composed of Asian home cooks, mostly Chinese and Indian. Group Three consisted of Hispanic home cooks, mostly Cuban.

Using ethnic recipes developed by FDACS, hired chefs prepared a selection of dishes in a controlled area using the frozen Nopalitos product. The dishes were brought to the group individually. Respondents tasted the following dishes and then discussed them:

1. Nopalitos and Pork (served rolled up in a tortilla)
2. Nopalitos Salsa (served with tortilla chips for dipping)
3. Dim Sum (steamed Asian dumplings with Nopalitos filling)

Dim Sum (steamed Asian dumplings with Nopalitos filling)

Chefs' Focus Group

Group One, made up of eight local Cuban and Asian chefs, was a very serious and enthusiastic group. They seemed to enjoy sharing details about their industry and their product preferences. Intrigued by the product, they all began making suggestions for improvement to the dishes they were served. Then one of them jumped up and said, "Where's the kitchen? Let's go!" All the chefs crowded into the test kitchen area, rolled up their sleeves and started cooking. Factors important to the chefs were texture, aroma, seasoning, and visual appeal. Their input included suggestions for ways to enhance those factors.






Group Two, made up of Asian American home cooks who were mostly of Chinese and Indian decent, was quiet, reserved and had no prior knowledge of nopales or Nopalitos for cooking. One participant did say he used to drink cactus juice in Hong Kong for health reasons. They expressed a preference for specialty items, especially fresh products, and said that quality and health benefits were crucial to them.

The California Cactus Center in Pasadena, CA has documented an increased interest from other ethnic groups in cactuses, in particular, Asians. Researchers there say that more Asians are buying plants and studying their uses and nutritional benefits. Asians represent one of the fastest-growing segments of the American population and, according to the 2000 US Census, now represent 4.3% of the population, or 12 million Americans.

Comparisons were made between Nopalitos and tofu because neither has a distinct taste, does not add flavor to dishes, and tastes differently in each dish in which it is used. One participant said, "Thank goodness for the sauce!" All expressed an interest and seemed open to trying the product at home if it were packaged in a smaller unit for retail sale. The only negative reaction was to the thawed product visible through a clear window in the package. Most of the group members said they would rather see a white bag with a photograph of the product printed on it.

Group Three, the Hispanic home cooks, mostly Cuban Americans, professed a preference for Florida grown products. They felt that quality and freshness are very important and choose products in this order: fresh, then frozen, and lastly, canned. All the participants had very positive reactions to the dishes prepared with frozen Nopalitos and said they would buy the product and use it if it were available where they shop. Other input included positive comments on the color of the product, its use as filler in recipes, and the mild taste and texture. Finally, the group felt the best way to market and sell Nopalitos is by conducting in-store demonstrations and samplings.

Method Two: In-store Cooking Demonstrations and Taste Tests

Product demonstrations and taste tests were conducted in two Sedano's supermarkets. Sedano's, a chain of about 25 supermarkets and a dozen pharmacies in southern Florida, is one of the nation's largest Hispanic-owned businesses. Founded in 1961 by Armando Guerra, Sr., a Cuban banker and grocer, the stores still play salsa music on the store loudspeakers and the clerks greet customers in Spanish. Packaged Hispanic foods and Latin American fruits and vegetables sit on the shelves next to typical American fare.

Location #1

Location #2

A Cuban American chef was hired for the in-store cooking demonstrations and, using her own recipe for Cactus Chile (Nopalitos con Chile), prepared and served the product for sampling. As the dish was tasted, the chef engaged tasters in conversation, mostly in Spanish, regarding the product.

The tasters were then asked to complete these questions:

1. Do you buy fresh nopal cactus? *8% Yes, 92% No*
2. Do you buy canned nopal cactus? *8% Yes, 92% No*
3. Do you like the dish you just tasted? *90% Yes, 10% No*
4. Would you cook this dish at home? *77% Yes, 23% No*
5. Would you cook other dishes using this product? *78% Yes*, 2*2% No*
6. How much would you expect to pay for this package of frozen Nopalitos? *Range: $2.37 - $5.00*
7. What year were you born? *Most left this blank.*
8. Are you married? *58% Yes, 42% No*
9. Do you have children under the age of 18 living at home? *34% Yes, 66% No*






Conclusions

According to the information conducted during this research project by FDACS' Division of Marketing and Development, Hispanic and Asian residents of South Florida and Miami are not familiar with Nopalitos or any other cactus product for cooking. When exposed to the product, the reaction is favorable. The Miami area residents would require a detailed campaign of education and promotion, beginning with in-store product demonstrations and taste tests, to get them to consider purchasing the product and adapting their traditional recipes to its use. The same tendency is applicable to other regions in the United States, as well as worldwide foreign market potential areas that do not reflect a high percentage of Mexican population.

Address challenges to the producers and exporters of Nopalitos.

- **Conduct research among small group of Mexican growers in Florida that are supplementing their bean and tomato crops with Nopalitos crops. Assess projected yield production estimates and compare to actual yield figures, in order to make crop feasibility recommendations.**

The Florida Department of Agriculture and Consumer Services began conducting research in 2002 in conjunction with Plantation Specialty Foods, Inc, (PSF) a company that is contracting bean and tomato farmers in the Felda, FL area to grow nopal with an estimated yield of 60,000 pounds per acre per year. Actual yield figures are not available, but PSF's goal is to process and market 21,000,000 pounds of frozen Nopalitos per year, all grown in southwest Florida.

Nopal field in Felda, FL

Nopal being harvested in Felda, FL

Nopal cacti are able to thrive in semi-arid and arid regions where few crops can be cultivated. Nopal also has high productivity and quick recovery after harvesting.

After an article ran in the Fall 2003 issue of the *Fresh from Florida Magazine (circulation 10,000)*, numerous inquiries regarding interest in growing nopal crops were received. These trade leads were collected and passed on to PSF to pursue for future use as contractual farmers.

- **Conduct research on processing and transporting frozen Nopalitos. Identify challenges and assist exporters with improvement.**
  Frozen Nopalitos did not exist in the commercial market. To date, Plantation Specialty Foods, Inc. (PSF) is the only known U.S. company that has successfully frozen the product. They developed a freezing process that gives I.Q.F. (Individually Quick Frozen) Nopalitos an equal or superior grade to fresh leaf. The Florida Department of Agriculture and Consumer Services' Bureau of State Farmers' Markets located and donated an I.Q.F. chiller and vegetable sorting, grading and storage apparatuses to PSF. This donation was authorized by Florida Statute 570.242 for entrepreneurial entities for agricultural economic development.

  The primary challenge to be faced was to develop the technical specifications for freezing and transportation. Since the proper enzyme levels control the shelf life and quality, literally ten of thousands pounds of product have been run under controlled conditions in four different freezer plants to determine the exact processing conditions. PSF has also had to develop the frozen food industry product specification for Nopalitos, since none existed.

Nutrition Facts
Serving Size 85g (85g)
Servings Per Container – 10

Amount Per Serving
Calories 25 **Calories from Fat** 0

	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat –g	–%
Cholesterol 0mg	**0%**
Sodium 0mg	**0%**
Total Carbohydrate 4g	**1%**
Dietary Fiber 1g	**5%**
Sugars 4g	
Protein 1g	

Vitamin A % • Vitamin C 30%
Calicium 25% • Iron –%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

	Calories	2,000	2,500
Total Fat	Less Than	65g	80g
Sat.Fat	Less Than	20g	25g
Cholesterol	Less Than	300mg	300mg
Sodium	Less Than	65g	80g
Potassium		3,500mg	3,500mg
Total Carbohydrate		300g	300g
Dietary Fiber		25g	30g

Calories per gram:
Fat 9 • Carbohydrates 4 • Protein 4

Left: Food industry product specification developed by PSF for its two-pound frozen food packaging.

One serving (85 grams) Nopalitos have the same amount of calcium as 8 ounces of milk, thirty percent of the daily value. Nopalitos are also low in carbohydrates and sodium and are rich in pectin, a soluble fiber.

The Nopal has also been used as a medicinal plant and is a hallmark vegetable in the Latin American diet. Various hospital-based clinical studies have reported its ability to decrease blood glucose levels, decrease the hyperglycemic peak during glucose tolerance testing, and control experimentally induced diabetes by increasing the body's sensitivity to insulin.

  Transportation difficulties have arisen while attempting to deliver freshly harvested nopal from the field to the processing plant in the proper time to control quality. The spines must be removed before the fresh leaves are chopped and frozen. After the spines are removed, the leaves oxidize and spoil within 48 hours. If not frozen quickly after despining, the product tastes "grassy" and stale. The product also loses its bright green color and turns a dull "army" green.

  After freezing, the temperature needs to be held at a constant level during processing, packaging, storage and shipment. Partial thawing and refreezing results in freezer burn, discoloration and deteriorated flavor. This problem can become intensified under adverse conditions, making it difficult and expensive to ship small sample amounts all over the country to potential distributors. To overcome this barrier and speed up the process, PSF also contracts freezing and packing out to companies in other locations closer to fields.

- **Identify problems and barriers in existing channels of trade, transportation and distribution and explore improvements to marketing practices, facilities, or systems to address these barriers.**

  The first barrier is the cost of farming nopal. Locating the best seed stock for an adequate supply for first planting can be difficult, as well as continuing to maintain seed stock beds. Continuing to produce and maintain germplasm for the planting of several hundred acres is time consuming and costly, but pays off in the long run. First harvest commonly occurs four months after planting and continues to produce for 5 to 6 years.

  Since nopal cactus is indigenous to dry conditions, its cultivation can be restricted by an abundance of moisture, an absence of nutrients, and excessively low temperatures. Fungus from too much rain or standing water in the field can wipe out a crop. Inadequate fertilization will limit plant and crop size. Temperatures dropping below freezing can burn the bud and cause dramatic crop loss.

  The arrival of the cactus moth (*Cactoblastis cactorum*), could pose a potentially serious threat to both wild and cultivated nopal. Small and young plants are particularly vulnerable. Currently the moth occurs in Florida and is slowly moving west around the gulf coast toward Texas and Mexico. The illegal transport of cacti from other countries through airports, harbors and international borders is a serious concern and could aid in the spread of moth infestation. Potential control options, as yet undeveloped or tested, would be the use of traps, attractant-and-kill systems, or biopesticides such as neem. Preventative actions would be alerting producers or technicians involved in nopal cultivation of the threat this insect poses and what they should do if they encounter it, which is to remove the egg sticks by hand.

  The development and implementation of information and education programs involving producers, cactus societies, environmental groups, grower groups, and research institutions would help address most of the barriers covered above. The focus should be not only on the problems faced by nopal producers, but also on the positive factors for producing and processing nopal.

Assist small and medium scale producers in their attempts to access the new and expanding Nopalitos market and apply supply chain management in the marketing system.

- **Assist Nopalitos producers with establishment of business relationships with distributors and stores.**
  1. The Florida Department of Agriculture and Consumer Services' Division of Marketing and Development developed trade leads from Sysco Food Services of South Florida, Goya, Monterey Foods, L&J Foods, Alberston's, Publix and Winn Dixie. These contacts were forwarded to Plantation Specialty Foods, Inc. (PSF). PSF is also currently working with U.S. Foods, Redi-Foods, A. Duda and Sons, Azetec and Sedano's.

2. In September 2003, The Florida Department of Agriculture and Consumer Services' (FDACS) Division of Marketing and Development attended The Florida Restaurant Show, the largest foodservice and hospitality exhibition in the Southeast, bringing foodservice suppliers in touch with buyers. FDACS' Division of Marketing and Development set up a "Florida Pavilion" at the show and PSF was a featured guest speaker on Nopalitos. Birds Eye approached PSF after their presentation.

3. In July of 2004, PSF approached the Florida Department of Agriculture and Consumer Services' Division of Marketing and Development for assistance with a trade show booth design. After consultation and recommendations, PSF reserved booth space and attended the Colorado Boxed Beef Company "Taste of Colorado Beach Bash" in Orlando in August of 2004. Contacts made for possible food industry and retail distribution included Barnhill's Restaurant and Piggly Wiggly Stores.

4. A web site was produced in order to publish the Quincy, FL focus group research results on line: English www.florida-agriculture.com/Nopalitos and a mirror site in Spanish www.florida-agriculture.com/Nopalitos_Spanish.

5. A PowerPoint presentation was created to assist sales reps. It is posted on line at www.florida-agriculture.com/Nopalitos.

- **Set up and conduct store promotions and cooking demonstrations using frozen Nopalitos.**

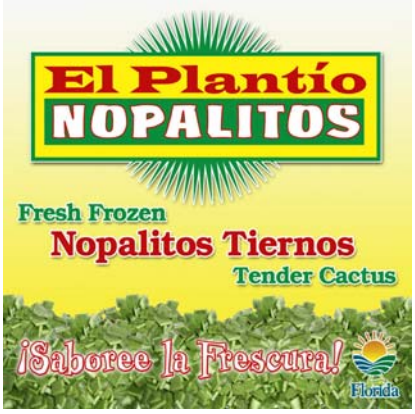
English 30.wma Spanish 60.wma

Double click on the icons above to hear the radio spots using Window Media Player.

Project details and results are covered on pages 8-10.

A radio spot was produced in both English and Spanish to be aired for store promotions and general advertisements. Custom tags specifying dates, locations or sales can be added as the spots are used.

- **Use information collected in North Florida focus group to design frozen Nopalitos point-of-purchase signage.**



Point-of-purchase sign

Frozen food dangler

These point-of-purchase signage designs were developed in coordination with Plantation Specialty Foods, Inc. El Plantio is the brand name label developed for the PSF line of Hispanic food products.

- **Use information collected in North Florida focus group to design a frozen Nopalitos fact sheet.** Please see the attached Fact Sheet designs in both English and Spanish below. This design was also used as a back cover ad in the March issue of *Today's Restaurant News*, specifically targeted to the Hispanic market. (Circulation: 25,000+)

- **Conduct market research for restaurant / food service interest in frozen Nopalitos.** Research was begun during the Miami project with the chefs. (See pages 6-8) The most valuable data collected reflected that most chefs are not familiar with Nopalitos, but are intrigued and would consider using it in their recipes. Additional research and an intense advertising and promotional campaign are recommended. Components should be product education materials, demonstration, taste tests, recipes, radio and television ads.

- **Produce a recipe booklet to illustrate multiple uses for frozen Nopalitos.**

Growing knowledge of the benefits of Nopalitos has helped spur demand for fresh cactus, and retailers are responding. Two of the nation's largest retail grocery chains, Wal-Mart, Kroger's and Albertson's, stock them in their produce aisles. Other supermarkets make them available for the high-demand Lenten season. Nopales, as well as products made from them, can be found on the Internet.

However, most retailers and customers do not know about PSF's frozen Nopalitos. Recipe development, along with general instructions for using the product, are essential. A web site created for this purpose is available on line at <www.florida-agriculture.com/nopalitos/recipes.htm>.

The fleshy "leaf" of the nopal, is traditionally eaten in Mexico sautéed with onions and chili peppers (above on the left side of the plate).

For More Information

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